

B1

Sub D1

1. (Twice Amended) An ESD protection structure having a single crystal Si-sided diode

used to protect an internal circuit, the ESD protection structure electrically connected between an input pad and a node and the internal circuit electrically connected to the node, the ESD protection structure comprising:

a single crystal Si resistor formed over an insulating material layer, electrically coupled between the input pad and the node, wherein the single crystal Si resistor is horizontally isolated by an isolation structure; and

at least a single crystal silicon-sided junction diode formed over the insulating material layer, wherein the single crystal silicon-sided junction diode is electrically coupled between one terminal of a corresponding power supply and a node.

B2

Sub D2

9. (Twice Amended) An ESD protection structure having a single crystal Si-sided diode

used to protect an internal circuit formed from an insulating material layer on a SOI, the ESD protection structure electrically connected between an input pad and a node and the internal circuit electrically connected to the node, the ESD protection structure comprising:

an input resistor including a plurality of single crystal resistors formed over the insulating material layer, wherein each of the single crystal resistors is electrically coupled between the input pad and the node, wherein the single crystal resistors are horizontally isolated by an isolation structure therebetween; and

B2
cont

at least a single crystal sided junction diode formed over the insulating material layer, wherein the single crystal sided junction diode is electrically coupled between one terminal of a corresponding power supply and a node.

*Sub
D3*

B3

14. (Once Amended) A semiconductor structure of ESD protection, the ESD protection electrically connects between an input pad and an integrated circuit, the semiconductor structure comprising:

- a semiconductor substrate;
- an insulating layer, formed on the semiconductor substrate;
- at least a single crystal Si resistor, formed over the insulating layer;
- at least a single crystal Si-sided junction diode, formed over the insulating layer, wherein the single crystal Si-sided junction diode does not includes a MOS transistor serving as a diode;
- a first conductive layer, formed over the insulating layer, used to electrically connect one terminal of the single crystal Si resistor and the input;
- a second conductive layer, formed over the insulating layer, used to electrically connect another terminal of the single crystal Si resistor and the integrated circuit; and
- a third conductive layer, formed over the insulating layer, used to connect the single crystal Si-sided junction diode and the integrated circuit.

*Sub
D4*

B4

21. (Once Amended) An ESD protection structure used to protect an internal circuit, the ESD protection structure electrically connected between an input pad and a node, and the internal circuit electrically connected to the node, the ESD protection structure comprising:

B6

a single crystal Si resistor formed on an insulating material layer, electrically coupled between the input pad and the node; and

a single crystal layer formed on the insulating material layer, wherein the single crystal layer comprises at least two doped regions with different dopant type to form a side junction diode, and the side junction diode is electrically coupled between one terminal of a corresponding power supply and a node, wherein the side junction diode is not a MOS device that serves as a diode.

REMARKS

Present Status of the Application

The Office Action rejected all presently-pending claims 1-21. Specifically, the Office Action rejected claims 1-21 under 35 U.S.C. 103(a), as being unpatentable over Yamaguchi et al. (U.S. Patent 6,118,154) in view of Hu et al. (U.S. Patent 6,121,077). Applicants have amended independent claims 1, 9, 14, and 21 to improve their clarity. A marked up version of the claim amendments, illustrating the amendments made thereto is attached at Tab A. After entry of the foregoing amendments, claims 1-16 and 18-21 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Summary of Applicant's Invention

The Applicant's invention is directed to an ESD protection structure having sided single crystal Si junction diode for protecting an internal circuit. The ESD protection structure is electrically coupled between an input pad and a node, and the internal circuit is electrically